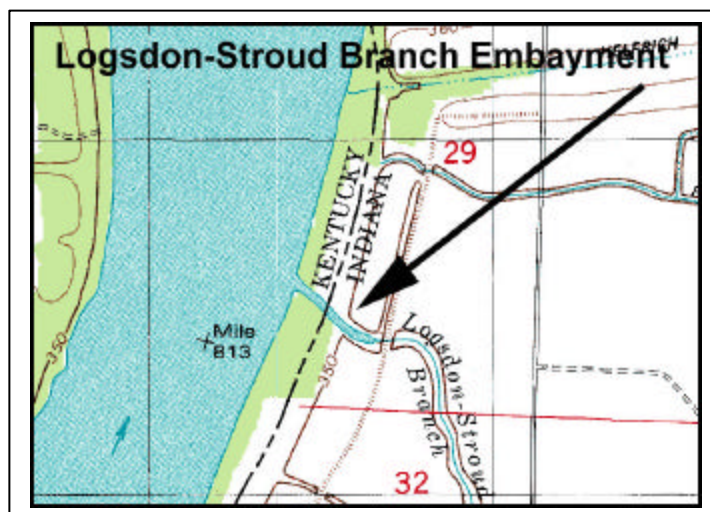


Logsdon-Stroud Branch Embayment (IN-17)

1.0 Location

The proposed Logsdon-Stroud Branch Embayment project area is located in Vanderburgh County, Indiana approximately 8 river miles downstream of Henderson Kentucky and 4 miles upstream from the village of West Franklin, Indiana. The project site is located in the J. T. Meyers Pool at Ohio River Mile (ORM) 813.1. This rural agricultural area is within the jurisdiction of the Louisville District, U.S. Army Corps of Engineers (USACE).



Aerial View of Logsdon-Stroud Branch

2.0 Project Goal

Ohio River embayments have historically provided important and diverse off-channel habitat for many fish species. Over the years many of the embayments have silted in and no longer maintain the quality or diversity of habitat previously provided.

The primary goal of the Logsdon-Stroud Embayment project is to restore the aquatic backwater habitat in the embayment. The restoration will provide improved reproductive, feeding, nursery, high water refuge, seasonal migration, and overwintering habitat for fishes in the Ohio River. Enhanced spawning and overwintering habitat along with increased habitat diversity would improve species diversity, facilitate a sustained fishery resource, and improve the recreational fishery in the area.



3.0 Project Description and Rationale

The habitat in Logsdon-Stroud Embayment will be restored by dredging an approximately 10-12 foot deep channel in the embayment. The restored area will be from the mouth of Logsdon-Stroud Branch at ORM 813.1 to the upstream portion of the embayment at the water control structure located within the protective levee at the site. The area to be dredged will include the entire existing embayment. The dredging will be at a 3:1 slope resulting in a new channel sloping from the shoreline to approximately 12 feet in depth along the centerline of the channel. The overall width of the embayment will increase by approximately 200% over existing conditions (i.e. the current 40 ft channel will increase to approximately 120 ft in width). Based upon the narrow nature of the channel and accessibility to the site, a land-based dragline dredge will be used instead of the standard river hydraulic dredge system. Dredge spoil will be side cast onto the agricultural fields adjacent to the embayment.

4.0 Potential Project Alternative

The Logsdon-Stroud Embayment is currently a narrow channel between the Ohio River and the water control structure associated with the protective agricultural levee at the site. The proposed project will result in improved water depth throughout the embayment while increasing the general overall width of the embayment by approximately 200 percent. The 3:1 slope of the proposed project will increase the amount of deep water habitat in the embayment whereas the amount of shallow water littoral habitat will remain relatively unchanged.

An alternative to the proposed project would be to leave the mouth of the embayment similar to the current configuration but to increase the width associated with restoration in the rest of the embayment, to allow for a more gradual slope (e.g. 20:1). This would result in an overall increase in aquatic habitat and would include both shallow water and deep water areas. The shallow water areas could be planted with aquatic vegetation or trees (e.g. bald cypress). The overall result of this project alternative will be improved deep water and improved shallow water habitat in the embayment. This alternative would, however, be more costly to implement and would result in additional acres of adjacent cropland being converted to aquatic habitat.

5.0 Existing Conditions

Terrestrial/Riparian Habitat: The terrestrial habitat at the project site is primarily agricultural in nature. Row crops, corn and soybeans, are the dominant features in the area. Immediately adjacent to the embayment a few black willows (*Salix nigra*) and silver maples (*Acer saccharinum*) are present. These trees are most common near the mouth of the embayment. Along the top edge of the embayment a band of smartweed (*Polygonum* sp.) is present between the bank and the agricultural land.

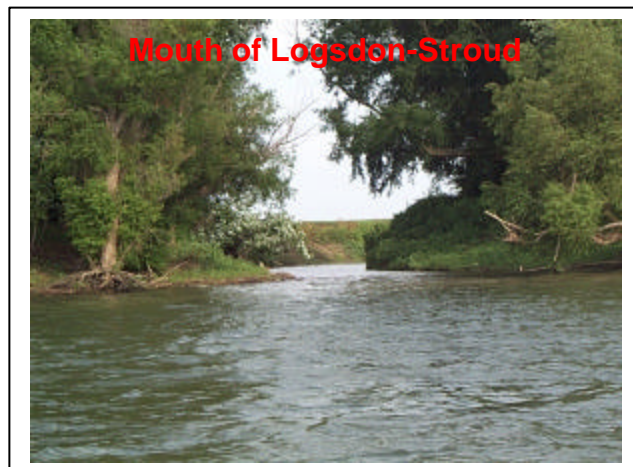
Agriculture at Logsdon-Stroud



Logsdon-Stroud Bank Vegetation



Aquatic Habitats: Logsdon- Stroud is a narrow shallow embayment resembling a ditch. Water depths are 2-4 feet under normal pool conditions. Bottom substrates are principally silt and mud. Instream cover is lacking except for some woody material at the mouth of the embayment and some rocks near the water control structure. The soft substrates and shallow nature of the embayment are apparently a result of sediment deposition from agricultural lands within the Logsdon-Stroud watershed as well as from deposition from the Ohio River during flood events.



Wetlands: There are no jurisdictional wetlands within the project site (Mouth of Logsdon-Stroud to the water control structure).

Federally-Listed Threatened and Endangered Species According to the U.S. Fish and Wildlife Service (USFWS), there are 2 federally-listed endangered species known to occur in Vanderburgh County, Indiana (Table 1). The riparian corridor adjacent to the Ohio River may provide peregrine falcons with roosting/perching habitat adjacent to open water feeding areas. It is unlikely that any nesting activity exists in the project area. The American burying beetle is generally associated with upland habitats such as grassland prairie, forest edge, and shrubland. It is unlikely that the beetle would be found on the project area.

Table 1. Federally-listed species known to occur in Vanderburgh County, Indiana.			
Common Name	Scientific Name	Federal Status	Habitat Present
Peregrine falcon	<i>Falco peregrinus</i>	E/SA	No
American burying beetle	<i>Nicrophorus americanus</i>	Endangered	No
Source: U.S. Fish and Wildlife Service, 1999			

7.3 Planning/Engineering Assumptions

- ◆ A 7 cubic yard dragline dredge would be used, and the material would be side cast directly on the adjacent agricultural fields.
- ◆ Bottom side slopes will be reshaped to a 3:1.
- ◆ No Finished grading of the banks would be done.
- ◆ The disturbed banks of the channel would be seeded.

8.0 Cost Estimate (Construction)

Dredging - Engineering costs for the proposed project are contained on Table 2. A detailed MCACES cost estimate for the proposed project is included in Appendix D.

Table 2. Engineering Costs.	
Item	Cost
Dredging	\$67,300
Reseeding	\$800
Mobilization	\$8,000
TOTAL	\$76,100

9.0 Schedule

Logsdon-Stroud Embayment Dredging: The estimated construction time is shown on Table 3.

Table 3. Construction Schedule.	
Item	Time
Dredging	28 Days
Reseeding	1 Day
Mobilization	2 Days
TOTAL	31 Days

10.0 Expected Ecological Benefits

Terrestrial/Riparian Habitat: Since most of the impacts associated with the Logsdon-Stroud Embayment project would be in-stream, there would be no reasonably foreseeable beneficial impacts to terrestrial/riparian resources.

Aquatic Habitats: Long-term beneficial impacts to aquatic resources would be anticipated as a result of implementing the proposed project. Dredging of Logsdon-Stroud Embayment would result in long-term beneficial impacts to fishes due to the improved/deepened access to the embayment. Fishes would be allowed free access to the embayment, especially during low flow periods. Habitat requirements for fishes change seasonally and improved access to the embayment would be considered beneficial. Restoring/increasing the depths of the embayment would provide over-wintering habitat for fishes, especially sport fish such as black basses (Sheaffer, 1986). The project would result in an overall increase in off channel aquatic habitat in the area.

Wetlands: There would be no reasonably foreseeable beneficial impacts to jurisdictional wetlands as a result of dredging the Logsdon-Stroud Embayment.

Federally-Listed Threatened and Endangered Species: There would be no reasonably foreseeable beneficial impacts to federally listed threatened and endangered species (American

burying beetle or peregrine falcon) as a result of implementing the Logsdon-Stroud Embayment project.

Socioeconomic Resources: There would be short-term and long-term beneficial impacts to socioeconomic resources as a result of implementing the proposed project. The short-term beneficial impacts would be related to costs and local expenditures associated with the dredging of Logsdon-Stroud. Long-term socioeconomic benefits would be realized through improved recreational fishing opportunities. Long-term indirect beneficial impacts will be realized through local expenditures for fishing tackle, bait, food, gas, and other associated products.

11.0 Potential Adverse Environmental Impacts

Terrestrial/Riparian Habitat: There would be long-term and short-term adverse impacts to the agricultural lands adjacent to the embayment. This area is privately owned and currently farmed. Long-term impacts would occur due to the loss of terrestrial habitat that will be converted to aquatic habitat. Short-term impacts would also occur associated with the disposal of the dredge material on the adjacent agricultural lands. Adverse impacts to this area would be considered short term, because it is assumed that the site can be farmed following the dewatering and grading of the dredge material. The agricultural field provides little habitat for terrestrial wildlife, and adverse impacts to terrestrial wildlife would be minimal and short term.

Aquatic Habitats: There would be a potential for adverse affects to aquatic species, especially immobile benthic invertebrates and young-of-the-year fishes during the dredging of Logsdon-Stroud Embayment. Localized populations of benthic invertebrates could be directly disturbed during the construction operation. In addition, sensitive aquatic species immediately downstream from the site could be adversely impacted by degraded water quality associated with displaced sediments, however these adverse impacts to aquatic species would be short term.

Wetlands: There are no jurisdictional wetlands at the Logsdon-Stroud site. Therefore, there would be no adverse affects to jurisdictional wetlands as a result of implementing the proposed project.

Federally-Listed Threatened and Endangered Species: There would be no reasonably foreseeable adverse impacts to federally listed threatened and endangered species (American burying beetle or peregrine falcon) as a result of implementing the Logsdon-Stroud Embayment project.

Socioeconomic Resources: There would be long-term and short-term adverse impacts to socioeconomic resources as a result of implementing the Logsdon-Stroud Embayment project. The long-term impacts will be associated with the permanent loss of terrestrial floodplain agricultural lands. There would be short-term adverse impacts associated with the temporary loss of farming at the dredge material disposal site. These impacts would be short term because it is assumed that the disposal area can be farmed following the completion of the dredge material dewatering.

12.0 Mitigation

Minor impacts associated with site dredging and spoil placement may occur during the construction of this project, however, no significant adverse impacts are expected. The use of best management practices and proper construction techniques would minimize adverse water quality impacts.

Following the completion of the dredging and spoil dewatering operation, the dredge disposal site will be graded and restored for agricultural purposes. This will allow the affected landowners to resume farming.

13.0 Preliminary Operation and Maintenance Costs:

Logsdon-Stroud Embayment Operation and Maintenance costs are summarized on Table 4.

Table 4. Operation and Maintenance Costs		
Maintenance	Frequency	Costs
Maintenance Dredging of Logsdon-Stroud	25 Years	\$15,000

14.0 Potential Cost Share Sponsor(s)

- ◆ USDA-Natural Resources Conservation Service
- ◆ U.S. Fish and Wildlife Service
- ◆ U.S. Forest Service
- ◆ Indiana Department of Natural Resources
- ◆ The Nature Conservancy
- ◆ Ducks Unlimited
- ◆ Local or County Government
- ◆ Local Economic Development Council
- ◆ Indiana Bass Federation or local BASS chapters
- ◆ Private corporations or marinas

15.0 Expected Life of the Project

It is anticipated that the dredging operation would provide meaningful depths for fishes for approximately 25-30 years before additional dredging would be necessary.

16.0 Hazardous, Toxic, and Radiological Waste Considerations

Potential impacts of hazardous, toxic, and radiological waste (HTRW) at the site were visually assessed during a site visit and further assessed via a database search of HTRW records in the site area.

Site Inspection Findings. The project area is at the mouth of Logsdon-Stroud Branch located at Ohio River mile 813.1 in Vanderburgh County, Indiana. The city of Evansville, IN on the Ohio River is located eight miles northeast of the project site.

The following environmental conditions were considered when conducting the June 3, 1999 project area inspection:

- | | |
|--------------------------------------|-----------------------------|
| ◆ Suspicious/Unusual Odors; | ◆ Impoundments/Lagoons; |
| ◆ Discolored Soil; | ◆ Drum/Container Storage; |
| ◆ Distressed Vegetation; | ◆ Electrical Transformers; |
| ◆ Dirt/Debris Mounds; | ◆ Standpipes/Vent pipes; |
| ◆ Ground Depressions; | ◆ Surface Water Discharges; |
| ◆ Oil Staining; | ◆ Power or Pipelines; |
| ◆ Above Ground Storage Tanks (ASTs); | ◆ Mining/Logging; and |
| ◆ Underground Storage Tanks (USTs); | ◆ Other |
| ◆ Landfills/Wastepiles; | |

Agricultural land surrounds the project area to the north, east and south, and the Ohio River is to the west. None of the environmental conditions listed above were observed in the project area.

Risk Management Data Search. A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The search complied with ASTM Standard Practice for Environmental Site Assessments, E 1527-97. The search report with maps showing the search area around the project site is presented in Appendix B. The search distance was configured to include the area of the project and a one mile buffer zone beyond the center-point of the project area. It was conservatively assumed that any environmental conditions beyond the project area buffer zone would not impact the project. Databases searched and the distance searched from the project site for each environmental item (e.g., USTs, NPL sites, etc.) are as follows:

Databases	Search Radius (Miles)
NPL: National Priority List	1.00
Delisted NPL	1.00
RCRIS-TSD: Resource Conservation and Recovery Information System	1.00
SHWS: State Hazardous Waste Sites	1.00
CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System	1.00
CERC-NFRAP: Comprehensive Environmental Response, Compensation, and Liability Information System	1.00
CORRACTS: Corrective Action Report	1.00
SWF/LF: Available Disposal for Solid Waste in Illinois- Solid Waste Landfills Subject to State Surcharge	1.00
LUST: Leaking Underground Storage Tank	1.00
UST: Underground Storage Tank	1.00
RAATS: RCRA Administrative Tracking System	1.00
RCRIS-SQG: Resource Conservation and Recovery Information System for Small Quantity Generators	1.00
RCRIS-LQG: Resource Conservation and Recovery Information System for Large Quantity Generators	1.00
HMIRS: Hazardous Materials Information Reporting System	1.00
PADS: PCB Activity Database System	1.00
ERNS: Emergency Response Notification System	1.00
FINDS: Facility Index System	1.00
TRIS: Toxic Chemical Release Inventory System	1.00
NPL Liens: NPL Leins	1.00
TSCA: Toxic Substances Control Act	1.00
MLTS: Material Licensing Tracking System	1.00
IN Spills: Indiana Spills	1.00
ROD: Record of Decision	1.00
CONSENT: Superfund (CERCLA) Consent Decrees	1.00
Coal Gas: Former Manufactured gas (Coal Gas) Sites	1.00
MINES: Mines Master Index File	1.00

The HTRW database search did not reveal the presence environmental conditions in the project area.

HTRW Findings and Conclusions. An inspection of the project site and a search of environmental records relevant to the project site and within the search radius have revealed no evidence of recognized HTRW problems in connection with this project site.

17.0 References

References:	
Scott, 1989	Scott, M.T. and L.A. Nielson. 1989. Young fish distribution in backwaters and main-channel borders of the Kanawha River, West Virginia. <i>Journal of Fisheries Biology</i> No. 35 (Supplement A) pp. 21-27.
Sheaffer, 1986	Sheaffer, W.A. and J.G. Nickum. 1986. Backwater areas as nursery habitats for fishes in Pool 13 of the Upper Mississippi River. <i>Hydrobiology</i> No. 136 pp. 131-140.
Sheehan, 1994	Sheehan, R.J., W.M. Lewis, and L.R. Bodensteiner. 1994. Winter habitat requirements and overwintering of riverine fishes. Fisheries Research Laboratory, Southern Illinois University, Carbondale, Illinois. Final Report F-79-R-6.
USFWS, 1999	U.S. Fish and Wildlife Service, July 1, 1999. Federally Listed Endangered and Threatened Species in Indiana.

APPENDIX A Threatened & Endangered Species

APPENDIX B Hazardous Toxic and Radiological Wastes

APPENDIX C Plan Formulation and Incremental Analysis Checklist**Project Site Location:**

The proposed Logsdon-Stroud Branch Embayment project area is located in Vanderburgh County, Indiana approximately 8 river miles downstream of Henderson Kentucky and 4 miles upstream from the village of West Franklin, Indiana. The project site is located in the J. T. Meyers Pool at Ohio River Mile (ORM) 813.1. This rural agricultural area is within the jurisdiction of the Louisville District, U.S. Army Corps of Engineers (USACE).

Description of Plan Selected:

The primary goals of the Logsdon-Stroud Embayment project are to restore the aquatic backwater habitat in the embayment. The restoration will provide improved reproductive, feeding, nursery, high water refuge, seasonal migration, and overwintering habitat for fishes in the Ohio River. Enhanced spawning and over-wintering habitat along with increased habitat diversity would improve species diversity, facilitate a sustained fishery resource, and improve the recreational fishery in the area.

Alternatives of the Selected Plan:

Smaller Size Plans Possible? **Yes** and description

Reduce the amount of dredging.

Larger Size Plan Possible? **Yes** and description

Increase the amount of dredging.

Other alternatives? **Yes** (related to increase dredging)

Restore/Enhance/Protect Terrestrial Habitats? ☐ No **Objective numbers met** ☐

Restore, Enhance, & Protect Wetlands? ☐ No **Objective numbers met** ☐

Restore/Enhance/Protect Aquatic Habitats? ☒ Yes **Objective numbers met** ☒ A1,A5,A7

Type species benefited: A wide variety of fish species.

Endangered species benefited: None

Can estimated amount of habitat units be determined: Approximately 3 acres of the embayment will be created/restored.

Plan acceptable to Resources Agencies?

U.S. Fish & Wildlife Service?

State Department of Natural Resources? **Yes** – Indiana DNR

Plan considered complete? **Connected to other plans for restoration?**

Real Estate owned by State Agency? No **Federal Agency?** No

Real Estate privately owned? Yes

If privately owned, what is status of future acquisition? Acquisition or agreements will be required

Does this plan contribute significantly to the ecosystem structure or function requiring restoration? What goal or values does it meet in the Ecosystem Restoration Plan?

Provide habitat diversity, spawning and nursery habitat, and winter velocity shelters for fishes.

Is this restoration plan a part of restoration projects planned by other agencies? (i.e. North American Waterfowl Management Plan, etc.)

No

In agencies opinion is the plan the most cost effective plan that can be implemented at this location?

Can this plan be implemented more cost effectively by another agency or institution?

Yes / No

Who:

From an incremental cost basis are there any features in this plan that would make the project more expensive than a typical project of the same nature? For embayment type plans is there excessive haul distance to disposal site? More expensive type disposal? Spoil that requires special handling/disposal?

Potential Project Sponsor:

Government Entity: _____

Non-government Entity _____

Corps Contractor _____ Date _____

U.S. Fish & Wildlife Representative _____ Date _____

State Agency Representative _____ Date _____

U.S. Army Corps of Engineers Representative _____ Date _____

Terrestrial Habitat Objectives

- T1 Riparian Corridors
- T2 Islands
- T3 Floodplains
- T4 Other unique habitats (canebrakes, river bluffs, etc.)

Wetland Habitat Objectives

- W1 Forested Wetlands: Bottomland Hardwoods
- W2 Forested Wetlands: Cypress/Tupelo Swamps and other unique forested wetlands
- W3 Scrub/Shrub Emergent Wetlands: isolated from the river except during high water and contiguous (includes scrub/shrub wetlands in embayments and island sloughs)

Aquatic Habitat Objectives

- A1 Backwaters (sloughs, embayments, oxbows, bayous, etc.)
- A2 Riverine submerged and aquatic vegetation
- A3 Sand and gravel bars
- A4 Riffles/Runs (tailwater)
- A5 Pools (deep water, slow velocity, soft substrate)
- A6 Side Channel/Back Channel Habitat
- A7 Fish Passage
- A8 Riparian Enhancement/Protection

APPENDIX D Micro Computer-Aided Cost Engineering System (MCACES)